*United States Department of the Interior*
**U.S. Geological Survey**
**5522 Research Park Drive**
**Baltimore, MD 21228**
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## USGS Maryland-Delaware-District of Columbia Water Science Center

## Seminar Series

# Tuesday, March 21, 2017 11:00 a.m.

# Effects of urbanization and infiltration-based watershed restoration on the hydro-ecology of headwaters streams

**Rosemary Fanelli, Hydrologist, U.S. Geological Survey**

Urbanization profoundly alters the hydrologic routing of a landscape, resulting in the degradation of downstream aquatic ecosystems and reduced aquatic biodiversity. To mitigate these effects, watershed managers implement stormwater control measures (SCMs), and increasingly infiltration-based SCMs, which are designed to convert stormwater runoff into groundwater recharge. However, the ability of infiltration-based SCMs to restore hydrological processes, and to reverse damage to the downstream ecosystem, remains poorly understood. To address this research gap, we examined the hydro-ecological effects of urbanization and SCM implementation, using regenerative stormwater conveyances (RSCs) as an example of infiltration-based stormwater control measures. RSCs are an emerging SCM design being widely implemented to manage stormwater in the mid-Atlantic region. We quantified changes in hydrology, aquatic insect biodiversity, and water quality across 11 headwater catchments spanning an urbanization-restoration gradient (forested, urban-degraded, and urban catchments restored with RSCs) near Annapolis, Maryland. High-frequency groundwater monitoring was also conducted in one RSC structure to identify potential mechanisms controlling RSC hydrologic function. This seminar will conclude with a discussion of SCM design and placement strategies, and the ongoing challenge of reversing the hydrological effects of urbanization and recovering biodiversity in urban headwater streams.

Example of a regenerative stormwater conveyance system.

Rosemary is a Hydrologist with the U.S. Geological Survey at the MD-DE-DC Water Science Center, where she studies the water quality effects of land use change and watershed management. Rosemary completed her PhD in Environmental Science at the University of Maryland-College Park in 2016; her dissertation research is the focus of this seminar. Previously, Rosemary earned a MS degree at SUNY-ESF in Syracuse, New York, where her thesis focused on groundwater-surface water interactions and streambed biogeochemistry.

*This presentation will also be available remotely via WebEx:*
https://usgs.webex.com/usgs/j.php?MTID=mc9ec0d74acb9ee464cefaf3fc5ebbf71
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